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MICROCOMPUTERS AND THE DISTRICT FOCUS FOR RURAL DEVELOPMENT IN KENYA*

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ABSTRACT

The district focus proposes to shift operational responsibility for rural development from the provincial-level government to the districts. The initiative creates a more direct link between ministries and district offices.

The use of microcomputers in activities supporting the district focus is described in each of three ministries: Ministry of Agriculture, Ministry of Finance and Planning, and Ministry of Health. Financial management, project management and financial planning are the three main areas of application. While most activities are found within the ministries themselves, each plans to introduce microcomputers on a pilot basis into one or more districts. The possibility of replacing obsolete "data capture machines" used in the Ministry of Finance and Planning's network with microcomputers is cited as a possible focal point for widespread district-level microcomputer implementation to begin.

While the current political atmosphere in Kenya regarding introduction of microcomputers is mixed, a major difficulty being experienced by governmental institutions and international donors is how to develop the local expertise to operate, program (usually in high level database language), and maintain the systems as well as provide follow-up support and technical assistance. A flexible approach to training and field support is suggested which could be provided by a single organization, probably on a short term (2-3 years) basis.

Even though macro political conditions and intentions will influence the shape and extent to which the district focus is realized, microcomputer-based management systems can play important, and perhaps indispensable roles, in that process.

I. INTRODUCTION

"The districts will become the centres for development in the rural areas, and I have instructed all ministries to ensure that this new approach is put into full operation by 1st July, 1983."

H.E. Hon. Daniel T. arap Moi

President and Commander-in-Chief of the Armed Forces of the Republic of Kenya; 21st September, 1982

With these words Kenya adopted a new policy, making districts the operational centers for rural development planning and implementation (1). Broadly, responsibility for the operational aspects of rural development are delegated to the districts while policy and the planning and implementation of multi-district and national projects remain with ministries. The intended effect is to improve the coordination and positive impacts of development projects by local units of government. Past efforts, especially when various governmental and nongovernmental agencies are involved, have been hindered (and sometimes abandoned altogether) by difficulties of coordination between and among the various development "actors." District-level planning "will facilitate both horizontal co-ordination and vertical communication while laying practical emphasis on the management of resources such as

personnel, vehicles, and equipment. This is expected to enhance efficiency and productivity leading to an improved standard of living for the people in the districts." (2)

The successful implementation of such a policy has vast implications, not only for Kenya, but for other African countries as well as elsewhere. For a nearly universal frustration encountered both by dedicated national civil servants as well as expatriate workers in development is the lack of managerial expertise required to effectively steward scarce development resources.

Volunteers in Technical Assistance (VITA) has been involved for many years in this problem from an information management perspective and more recently as managers of field projects, particularly in Africa. Since VITA has found in its own experience that microcomputer-based management systems can be extremely useful tools in this context, it conducted a brief survey in October 1984 of existing and potential roles for microcomputers complementing the district focus initiative. This paper outlines some of the salient results of that survey.

II. RESPONSIBILITIES OF THE DISTRICT

Each district, through its District Development Committee (D.D.C.), is charged with certain broad responsibilities. These include (3):

1. Planning and co-ordination
2. Financial management
3. Implementation
4. Local procurement

Planning and co-ordination refers to all projects in the district, whether government or donor-sponsored efforts as well as locally conceived and implemented projects. Financial management involves all aspects of local financial accountability which is described in some greater detail below. Implementation has to do with co-ordination of all labor and capital inputs--across ministries or under contract with private enterprise--to a given project. Local procurement is enhanced by increasing the amounts available to local authorities which effectively transfers authority from the national level to the district level.

It is in the area of financial management that the most dramatic examples of microcomputer use in support of the district focus have occurred thus far.

III. EXAMPLES OF SUCCESSFUL FINANCIAL MANAGEMENT USING MICROCOMPUTERS

A. The Ministry of Agriculture

Decentralized financial management is a major element in the district focus. However, both Kenyan and expatriate officials became aware by 1981 that difficulties in financial management

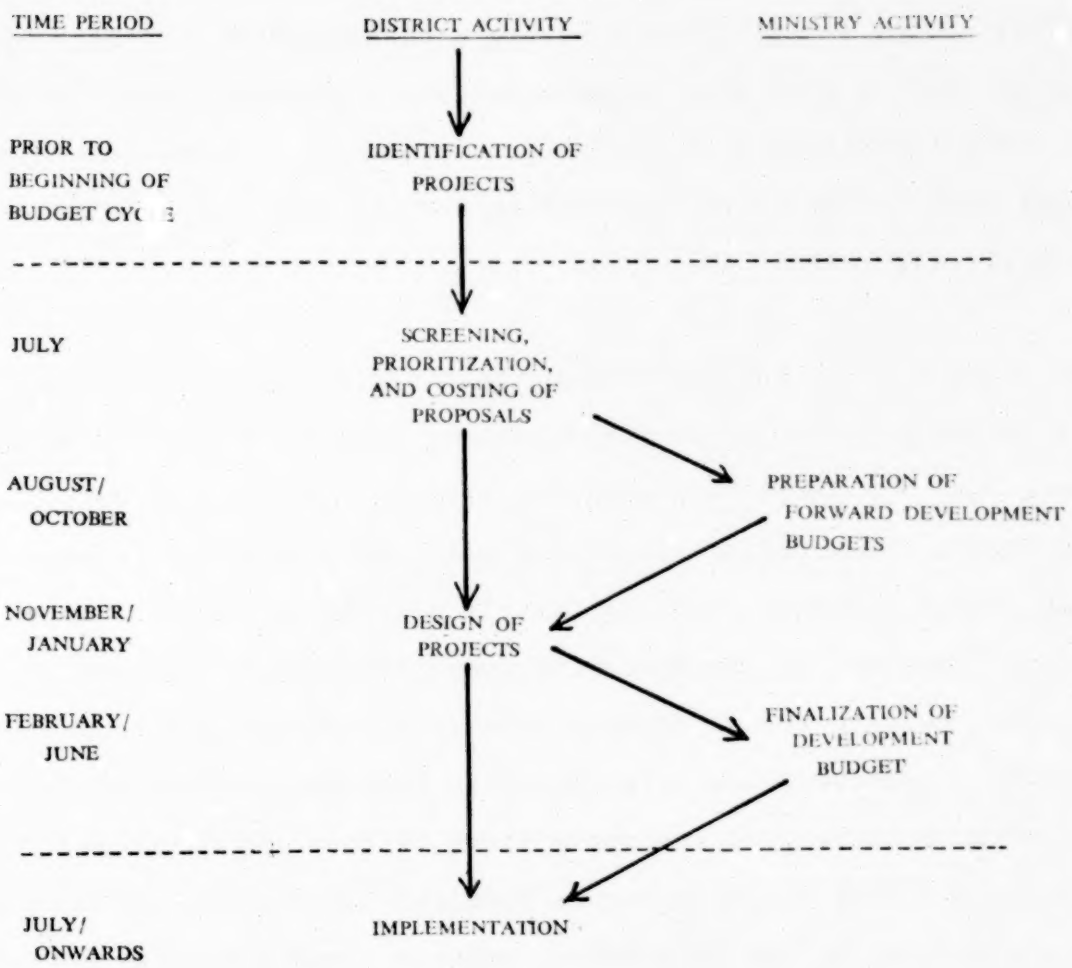
created major constraints to agricultural development in Kenya (4). During this period USAID supported a demonstration series of uses of microcomputers in the Ministry of Agriculture which resulted in a decision by the Ministry's financial managers to experiment with computerizing their expenditure monitoring system as well as allocating funds to the districts.

While tracking expenditures is obviously important for managing resources, in the Kenyan budget development process it is also an important planning input for the next fiscal year (see figure 1). Since most purchases in the field are done with vouchers provided to vendors which are later presented for payment, monthly reports are prepared by local spending officers to keep track of amounts committed and spent. Reports are compiled at the ministerial level and used for high-level review.

Unfortunately, "the traditional compiled reports were unfocused, inflexible, untimely, and inaccurate." (5) Typical problems included pages and pages of tables which made it most difficult to find problem expenditures; reports providing commitments of all spending stations on each item without the flexibility to get totals on each individual station's expenditures or the total on a single category without recalculating all the numbers; delays in collecting and processing information; and a variety of

Figure 1

ANNUAL BUDGET CYCLE (DEVELOPMENT)



errors, including submission of incomplete or incorrect forms as well as typing and addition mistakes made at various levels.

Consequently, reports were little used. "Major over and under-expenditures were largely unnoticed and corrective actions untaken. The main restriction on expenditure was simply the limit on the funds in the Ministry's cash account, so that bills would not be paid when presented, and creditors would slow down or stop the delivery of goods in consequence. Absolutely essential services would be hampered as much by this response as would low priority ones." (6)

In response to this situation the Ministry decided to adopt a microcomputer and popular spreadsheet program which alleviated some of the shortcomings listed above. First, reports were available much faster since they could be compiled if needed at any point without waiting for the all the provincial data to arrive; second, accuracy was improved; and, third, the ability to perform certain format changes made report design and readability easier. However, certain problems remained. Flexibility in getting a variety of reports without re-entering data was still required, some keypunch errors remained since error checking was not supported by the spreadsheet program, and a single software package was desired for use in both the expenditure monitoring

and funds allocation process. Eventually, a relational database manager replaced use of the spreadsheet.

After the budget process described in Figure 1 is completed, provinces allocate funds to district offices by issuing "Authorities to Incur Expenses" or AIEs. Under the district focus, AIEs are issued directly to the districts without going through the provinces. While this would ameliorate the problems of delays and misallocation at the provincial level, it also increased the amount of work at headquarters since many more AIEs would be issued (as many as 4000).

The same microcomputer/software system was used to produce preliminary allocations based on past experience. These were then reviewed by finance officers and division chiefs who made corrections which were then immediately fed into the computer having the effect of creating the legal AIEs themselves from the "working drafts" with very little extra effort. The effect is described below:

> The result of the exercise was a more rational set of allowances combined with the timely issuance of AIEs. In MOA (Ministry of Agriculture) the issuance was earlier than in any previous year,despite the trebling in the number of AIEs to be written. All districts and other spending stations now knew their level of spending authority within two weeks of the start of the financial year. (7)

Besides expenditure monitoring and field funds allocation, some attempts are being made to involve district officers in the

budget process itself, though at last report this is still in the process of evolving. Since the 1982/83 fiscal year, summary reports generated from the database manager have been used to bring requests from units within the MOA in line with ceilings issued by the Treasury. In fact, in that year requests were more than three times the ceiling, but the differences were successfully scaled down through use of the iterative review process made possible by the microcomputer/database manager. The effect has been, in subsequent years as well, to get the submissions close enough to be considered seriously by Treasury. The ability of the microcomputer to print drafts which can then be reproduced with ease is also reported as an important time-saving device.

This process will eventually allow the Forward Budget process to function as a true period of policy and program review and provides the basis for a comprehensive projects management system, the implementation of which is also a stated MOA priority. The system will incorporate financial monitoring with physical progress reports on a quarterly basis. Indeed, the district focus inherently generates a great amount of information which can probably only be properly managed through the use of microcomputers.

Given the apparent success of microcomputers to decentralize the financial management process within the MOA itself, it is probably inevitable that they will be used in this and other ways in field applications. The MOA has already made microcomputers available for field survey data collection and analysis on a short-term basis and there appears to be considerable interest for varied experimentation on a pilot project basis within selected district(s).

B. The Ministry of Finance and Planning

The MOA's success has directly influenced the Rural Planning Division of the Ministry of Finance and Planning which is actively promoting the use of microcomputers at district levels to assist in its financial planning process. All ministries obtain their financial data on field projects through MOFP's system of using obsolete "data capture machines" that produce paper tapes subsequently read into the ministry's mainframe computer in Nairobi. These systems currently exist in each provincial capital; the Rural Planning Division would like some sort of data capture facility in each district, creating several regional centers in addition to the provincial capitals. However, the current machines are very expensive and difficult to maintain since they are no longer manufactured. State-of-the-art microcomputers that not only serve the data collection purpose,

but also would allow for some local analysis, database management and word processing seem to be a good fit for the needs at hand.

In addition, the Division is developing a "Project Monitoring and Implementation Project" that in its initial phases at least will be used within the ministry to compile project data and donor information which is not now easily accessible. Again, for data collection purposes, it would be extremely useful to have the capability at the district level to generate the required information in the standard formats to be required by the ministry. In addition, reports that would aid in project implementation and coordination by the District Development Committee (and, in particular, by the District Development Officer) would be immediately generated. In fact, the most recent District Development Plans were completed on time through the use of the ministry computers' word processing capabilities, although whether this capability was a net positive or negative benefit is not clear. On the plus side, deadlines were met that had not been in the past (such plans had previously taken two years). On the negative side, training the secretaries was time-consuming and tended to exclude planning officers from the process. One unusual criticism voiced was that by producing high-quality documents, word processing was actually setting standards of production that could never be matched by the districts, so that future plans would tend to be produced at headquarters instead of at the

district level (unless, of course, the districts were to have access to their own computers!).

For both financial planning and project management purposes, it would seem that an ideal opportunity exists at the present time to incorporate microcomputers at the district level within the MOFP. This is not to deny that the actual implementation process is complicated or that it must be carried out carefully, but only to suggest that a clear opportunity exists now to mate the power of microcomputers to pressing needs that can clearly make use of that power within a set of clear policy objectives (the district focus). It is not always the case where the match is so obvious or well defined.

The writer witnessed a graphic example of this in action while discussing the ministry's handling of information related to current relief efforts in the northern part of the country. While looking at a print-out identifying the source tonnage and other characteristics of donated grain shipments, the head of planning arrived at that very instant to retrieve the print-out for an important meeting! Prior to the introduction of the microcomputerized database management system, such information was reportedly not available in Kenya.

C. Ministry of Health

The Ministry of Health is in the process of creating a Health Information System (HIS) that can provide health officials with reliable, timely and relevant data for accurate planning, supervision and management of health activities and programs. Reporting systems are currently operating for a number of components, such as general outpatient, immunization and inpatient services. However, the returns from just these components have been delayed due to the massive quantity of data collected and the lack of a well-designed system for collection, reporting and use of the information. The need to decentralize the HIS has highlighted both of these problems. Therefore in early 1984 the further expansion and decentralization plans of the current operation was delayed in order to develop a new system design. An information system for maternal and child health was chosen as the initial component for testing the new system design because no uniform procedure was in operation at the facility level. Developing a system in this area would therefore involve implementing a new system instead of modifying an existing system. The current activities of the HIS could continue as before without disruption.

During the developmental phase, special focus was placed on minimizing the amount of data collected. At the same time three major uses of the data were considered:

A. Planning based on health needs of the population
B. Supervision of personnel
C. Management of resources

Finally, the collection, reporting and analysis of the data at each level of operation was investigated. These procedures need to be clearly documented and tested in order for the data to be used by the health practitioners and officials working at each level.

Based on observations of patient flow at the dispensary, health center and district hospital level, the collection of data on maternal and child health was divided into two unique procedures: separating child services from maternal services. A permanent register would be the collection vehicle for both, which automatically limits the amount of data collected. Since the majority of health institutions in Kenya are dispensaries that have no statistical clerks to assist with the recording/reporting of the information collected, the registers would also be formulated to make the summarization as easy as possible.

By the end of 1984, the pre-testing of collection forms and pilot utilization of the information systems in four districts was to be achieved. During the writer's visit to the Ministry in fall 1984, installation of a minicomputer at headquarters was underway to process the field information gathered. Introductory

training was already being held on a microcomputer which would communicate with the larger machine and for system development.

Several officials expressed very strong interest in installing microcomputers in two districts to provide for local data analysis and access. This is in keeping with the almost universal expectation encountered by this writer that at some point local processing of information will be required, both to provide accurate inputs into the ministerial-level financial and project management as well as to enhance local decision-making capability, which, after all, is the essence of the district focus.

IV. CONCLUSIONS AND RECOMMENDATIONS

Kenya already provides fascinating material for the serious study of effects of microcomputers on the development process. On the one hand, official support for the introduction of microcomputers has been mixed. Import restrictions resulting in high duties may well impede early widespread adoption of the technology. It is also difficult for parastatal or private development organizations to acquire the duty-free status that would allow them to take advantage of numerous foreign donation programs providing either cash or equipment. Still, much is happening in Kenya in both public and private sectors. This writer conducted more than thirty interviews with donors, educa-

tional institutions, and public and private institutions resulting in a clear perception that the technology, if introduced, maintained and supported in a well-planned manner, will play vital roles in Kenya's development process. It is difficult to see how the true realization of the district focus can be achieved without use of the technology, given the examples from the three ministries above. However, it is too early to make any final judgements. One writer has concluded: "It is impossible to offer a final assessment of the effect of the microcomputer adoption on decentralization in Kenya....What is clear is that the impact on decentralization will be strongly influenced by macro political conditions, and that the outcome may well be mixed." (8)

Even if political conditions were clearly favorable, there are a number of obstacles to successful implementation to which we now turn. In this writer's estimation, the most significant bottleneck at the present time is the difficulty with which even the most innovative efforts can be maintained due to the lack of trained personnel. It is not that talented programmers and systems analysts do not exist in Kenya, but that ministries and donors alike do not have the time (and, frequently, the resources) to locate and contract these people (many are Kenyans, some Ugandans) and design the very specific training requirements that are characteristic of almost all computerized applications.

Some applications require short-term training (basically, operator training), others longer-term efforts where more knowledge of specific software programs (usually a database manager) is necessary in order to implement a sophisticated application. On-site travel and consultation is almost always important, since needs change over time and new programming adaptations are required, either by local staff or outside consultants. The ability to quickly replace inoperable equipment with a stand-in system is critically important to maintaining a reasonable implementation schedule and to restore confidence in skeptical managers that the technology is really worth the effort.

Thus, an institution or program that responds quickly on a customized basis to training, technical assistance and on-site support is important to gradually building up a cadre of skilled Kenyans. The need exists now at the ministerial level in support of district focus activities and will become of paramount concern when microcomputers are used in the districts themselves (and, indeed, at levels below the district). As we have seen, all three ministries above have plans to use microcomputers in the districts, the possible replacement of the Ministry of Finance' obsolete "data capture machines" providing the clearest example of an immediate need for such capability. As many explained to this writer, the ability of donors and ministries to turn over to a single organization the solution of inter-related issues de-

scribed above with a simple telephone call or brief consultations would vastly simplify the situation and is probably only required in the short-term (2-3 years).

Unfortunately, such an institution or program does not currently exist. While commercial outlets often provide some introductory training in applications software, this is almost always cursory and not sufficient. More in-depth training can be found in academic institutions (and perhaps in at least one interesting attempt to marry equipment donations from a commercial outlet with formal technical training), but these environments are not conducive to the solution of site-specific problems where detailed knowledge of the situation, including travel to the site, is required.

Other organizational considerations are also relevant whose importance have already been demonstrated in Kenya and elsewhere. For example, the manner in which microcomputers are introduced is critically important to successful implementation. There must be a clearly defined problem or set of problems to solve and the analysis of same should be done well before the computers arrive. The problem(s) additionally should perceived by local officials, not only by foreign advisors and consultants. If this perception has not yet matured, then there is little reason to promote implementation for its own sake. The important point here is

that once the computer has shown to be of value in solving the initial problem(s) for which it was acquired, other uses will likely be made of it--and local officials, not expatriates, will provide the inventiveness necessary for subsequent applications.

Certainly the technical support and hardware maintenance issues need to be looked at very carefully to ensure that major commitments in time and money are not stymied by an unexpected delay or unavailability of spare parts, redundant units, and such fundamental items as spare diskettes. Power conditioning is a certain requirement in rural areas where power supply fluctuations can ruin computers (and is not a bad idea even in Nairobi). Even in the United States, there is still a surprising amount of commercial software that contain "bugs," and faulty or incomplete documentation. It is especially important to be skeptical of dealers who insist that a given piece of software can perform functions that have not already been demonstrated elsewhere within the buyer's immediate network of users.

In VITA's experience, there are a few rules of thumb for the successful institutionalization of microcomputer-based management systems. First, it is very important to consider the effort as a **project** and assign a staff, budget, and timelines. Second, once the project outline has been identified, **double** both the amount

of time and money expected to complete it! In the Kenyan context, institutionalization is described as having taken place when all of the following conditions have been met: (1) Kenyans themselves **demand** the output from the machines; (2) all **operations** are done by Kenyans; (3) all **programming** is done by Kenyans, possibly by local consultants; (4) good microcomputer operators are **retained** by the civil service; and (5) maintenance and supplies are provided for the budget (9).

In summary, microcomputers have already made significant contributions to improving financial and project management within a Kenryan development context and have the potential to become key actors in implementing the distric focus. Especially in the northern industrialized contries, micromputers have become important tools in the decentralization of a host of institutional decision-making functions with measureably greater improvements in efficiency and productivity. Given sufficient political will, the same is possible for Kenya.

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DEVELOPMENT OF ELECTRONICS

IN

ZAMBIA*

Prepared by

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1. Introduction

Microelectronics is probably the most dynamic and challenging field in electronics. Positive and negative aspects of introducing microelectronics applications have been identified, but most developing countries are faced with the problem of how best they can enter this field in order to get maximum benefits and avoid pitfalls. This paper examines the impact of microelectronics and the experience Zambia has had in the field of electronics.

Electronics is, relatively speaking, a new field but coupled with advances in solid-state physics, physical chemistry, high vacuum technology and production engineering it has reached maturity very fast.[1/] Within the same field another area which has aroused much interest and activity is microelectronics. This area has overshadowed electronics to an extent that when one mentions electronics it would be right to assume one is referring to microelectronics. Microelectronics encompasses several approaches to the design and production of electronic circuits that result in circuits that are smaller than could be achieved with conventional discrete devices.

The new technology has introduced a new way in which to approach the manufacturing and designing of electronic circuits. To the designer of electronic circuits this has reduced his work to merely selecting and specifying micro-circuits and assembling them. The extra time acquired in this way will go a long way to improving the final end product. This is a welcome change as the product development cycle is reduced, resulting in reduced costs which are subsequently transferred to the consumer. In the case of the manufacturing of integrated circuits the same can be said except that not many will afford the large outlay of capital required to acquire the microelectronics manufacturing capability.

What are the implications of these developments which have been introduced by microelectronics? The most obvious is that the field is characterized by a large number of consumers of microelectronics rather than producers. Equipment sophistication will increase, this will introduce maintenance and service problems especially to developing countries. Microelectronics producers have to come up with better microcircuits almost every year for them to maintain their hold on the market. The consumer or the

designer of electronic equipment using microelectronics will have to adapt himself to designing circuits using microcircuits which will be available on the market. Expected useful life of electronic equipment will reduce not due to malfunction, but due to equipment becoming out-dated very fast.

For large consumers with large unit turnovers, possibilities already exist to go for custom-made microcircuits for their specific applications. This results in reducing costs further but has a disadvantage in that buyers of such equipment will be tied to specific dealers in form of maintenance or service contracts. This is because the equipment manufacturer has a monopoly as to whom he can supply service and replacement parts, further the price of such services can be manipulated easily as buyers have no alternative service from other producers. This situation will affect most of the developing countries who have no microelectronics manufacturing capability.

Taking into account these points, it seems logical that those who are mostly affected by the negative aspects of developments in the microelectronics technology, should find a suitable way at least to protect their interests. This can be achieved by acquiring some microelectronics manufacturing capability. With due respect to the large outlay of capital required in acquiring this technology, it is suggested that this is done on similar lines as the successful INTELSAT programme. A grouping of nations can form a regional microelectronics industry which will save the interest of the group. This will provide a fast and reliable source of microelectronics hardware in reliable sufficient quantities.

2. Experience in Zambia

Like in most developing countries Zambia's experience in the field of electronics is that of an end-user of electronic equipment. This trend was inherited at the time of independence from the previous colonial government whose only interest in Zambia was financial rather than development. Unfortunately after independence the nation was faced with other important tasks rather than concentrating on microelectronics.

Initially the electronics products were imported into the country. These included items like radios, television sets, and other consumer items. With the development of Zambia's industries, need arose for highly specialized electronic equipment to be imported for use in some of the industries. The equipment in this category included semi-automatic machines and control processes.

In the early 1970s there was a drastic change in Zambia's electronics imports - Zambia joined the computer age. Computers were imported into Zambia mainly for accounting and administrative purposes. Later developments in the field of telecommunications required large usage of electronic systems. In an effort to improve telecommunication facilities, the Post and Telecommunications Corporation switched to electronic telephone and telex exchanges, and the construction of the Mwembeshi Earth Satellite Station with aid from Japan. The mining companies in their efforts to reduce costs almost at the same time went into computerized accounting, administrative and planning systems. The Zambia Copper Mines, which are faced with stiff competition from abroad, are now introducing more and more automated processes in their mineral extraction programmes.

The consumer market for electronic products has provided an impetus for the "near" introduction of an electronics-based industry within the country. Companies like ITT Supersonic, Philips, National Cash Register and Erricsons have seen this need for electronic products and some of them have responded by introducing assembly facilities for their products. Though this technology is in the hands of internally based multinational corporations it goes a long way in showing that a potential market exists for electronic products in Zambia.

Most of the problems encountered by Zambia in its effort to use electronic technology have not been in the widely held views of displacing people from employment, but in servicing the technology. Faced with lack of foreign exchange reserves for purchase of spares to maintain and service equipment most of the equipment is not functioning. This problem has been compounded by the lack of suitably qualified personnel to innovate and service this sophisticated electronic equipment.

3. Present Situation

Most of the advancements in microelectronics have been due to research undertaken in universities in developed countries. The research undertaken in these universities formed the basis for a microelectronics industry to be established. It can be rightly concluded that the future of Zambia in microelectronics has a bearing on what the University of Zambia is doing in this field at the moment. A university forms a central core of any nation and it is from this body that ideas must emanate. The university in its research efforts must prove to the nation that the country is capable of developing and sustaining a given technology. Only then will industry move towards using research findings and implement that technology. It must be realized that industrial concerns are not prepared to experiment on technologies which in their view are not proven.

The University of Zambia, through the Department of Electrical and Electronic Engineering is making this a reality by introducing courses which prepare students for this eventuality. The Department has changed from offering a general electrical engineering degree programme to a more specialized one encompassing electrical machines and power, and electronics and telecommunications (ET). This trend enchances the fact that the development of an electronic manufacturing capability within the country cannot be overlooked. To this effect programmes at the University of Zambia include courses in physical electronics; microprocessors and microcomputing; and microprocessor industrial applications.[2/]

The Department has gone a far step further in achieving this task by taking technology to where it is needed - in industry. In its effort to spread positive aspects of electronic technology, the Department conducts courses in microprocessor applications,[3/] to industries within Zambia. Zambia Consolidated Copper Mines, which is the country's main foreign exchange earner, has benefited from contracts with the University. This not only helps the concerned industry by introducing new ideas to its employees but also helps in giving electronic technology a wider acceptance in Zambia.

4. Electronic Engineering Training Facilities

Training programmes can never be meaningful without equipment to back the theoretical knowledge with practice. The department maintains a number of laboratories for instruction purposes in ET. These laboratories include:

1. Electronic engineering laboratory: with facilities for processing printed circuit boards;

2. Microprocessor laboratory: facilities include microprocessor development systems, printers and trainer units;

3. Microcomputing laboratory: facilities include five ABC 800 minicomputers and supporting hardware. This laboratory was established together with a new course in microcomputing to preparing students to have software development expertise;

4. Control systems laboratory;

5. Telecommunications laboratory.

The facilities provided combine to give a good understanding of the electronic technology and the role of software in Zambia. The main driving force towards the microelectronics manufacturing will be the introduction of postgraduate programmes in the near future. These will provide suitable candidates for persuing research programmes in the field of electronics.

5. Conclusion

Though it is possible to develop a microelectronics manufacturing capability, without any contacts with the University, note here must be made that an industry will only be self-sustaining if the manpower requirements are satisfied. To develop local expertise in this field it must be stressed that this capability be developed at all levels. In Zambia though no direct efforts have been made to introduce microelectronics capability, the efforts by the University are directed towards such a goal in the near future. With the results of present programmes it can be said that by the year 2000 Zambia will have a microelectronics capability.

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